

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-13 are pending in the present application, Claims 2, 4, 6, 9-11 and 13 having been withdrawn; and Claims 1-13 having been amended. Support for amended Claims 1-13 can be found, for example, in the claims, drawings, and specification as originally filed.¹ No new matter has been added.

In the outstanding Office Action, Claims 7 and 8 were rejected under 35 U.S.C. § 112, second paragraph; Claims 1, 5, 7, 8 and 12 were rejected under 35 U.S.C. § 103(a) as unpatentable over Takayanagi et al. (U.S. Patent Publication No. 6,396,570; hereinafter “Takayanagi”) in view of Ahrenkeil (U.S. Patent Publication No. 4,165,471); Claim 5 was rejected under 35 U.S.C. § 103(a) as unpatentable over Takayanagi in view of Bellutti et al., Microelectronics Reliability 39, (1999) 181-185 (hereinafter “Bellutti”); and Claim 3 was rejected under 35 U.S.C. § 103(a) as unpatentable over Takayanagi in view of Suzuki et al. (U.S. Patent Publication No. 4,136,292; hereinafter “Suzuki”).

With respect to the rejection of Claims 7 and 8 under 35 U.S.C. § 112, second paragraph, Applicant has amended the claims to correct the informalities noted in the outstanding Office Action.

Accordingly, Applicant respectfully requests that the rejection under 35 U.S.C. § 112, second paragraph, be withdrawn.

In response to the rejection of Claims 1, 5, 7, 8 and 12 under 35 U.S.C. § 103(a) as unpatentable over Takayanagi in view of Ahrenkeil, Applicant respectfully submits that amended independent Claim 1 recites novel features clearly not taught or rendered obvious by the applied references.

¹ See specification, page 7 lines 7-8 and Fig. 1.

Amended independent Claim 1 is directed to a time-of-flight range-finding sensor including, *inter alia*:

...an insulator layer formed on a semiconductor substrate;
two conductive photo-gate electrodes *adjacently disposed so as to define a gap between the two photo-gate electrodes*, and being transparent for a wavelength of a light reflected by the target object; and
first floating diffusion layers disposed under and at ends of the photo-gate electrodes,
wherein a uniform optical path exists along the full-width of the gap, and regions of the semiconductor substrate beneath the two photo-gate electrodes and beneath the gap are used as a photodetector layer.

Takayanagi describes a distance measurement apparatus that irradiates an object from a light source and receives the reflected light to obtain a distance to the object.²

However, Takayanagi fails to teach or suggest “two conductive photo-gate electrodes *adjacently disposed so as to define a gap between the two photo-gate electrodes*... wherein *a uniform optical path exists along the full-width of the gap*,” as is recited in amended Claim 1.

Specifically, Takayanagi describes that a photoelectric conversion area 2 is implemented using a MOS light receiver 101 provided with a central gate electrode having good light transmittance,³ and a voltage is applied to the central gate electrode to form a depletion layer on the surface of the p-type semiconductor substrate 1. Thus, in Takayanagi, because the central gate electrode is disposed between the first and second transfer gates 5 and 6,⁴ there is no gap between the two photo-gate electrodes and there is not a uniform optical path existing along the full-width of the gap.

Applicant respectfully submits that Ahrenkeil fails to cure any of the above-noted deficiencies of Takayanagi.

² See Takayanagi, Abstract.

³ See Takayanagi, column 1, lines 55-57.

⁴ See Takayanagi, column 1, lines 64-67.

Therefore, Applicant respectfully submits that independent Claim 1 (and claims depending thereon) patentably distinguishes over Takayangi and Ahrenkeil.

Accordingly, Applicant respectfully requests that the rejection of Claims 1, 5, 7, 8 and 12 under 35 U.S.C. § 103(a) be withdrawn.

In response to the rejection of Claim 5 under 35 U.S.C. § 103(a), Applicant notes that Claim 5 is dependent on Claim 1 and is believed to be patentable for at least the reasons observed above. Further, Applicant respectfully submits that Bellutti fails to cure any of the above noted deficiencies of Takayangi and Ahrenkeil.

Accordingly, Applicant respectfully requests that the rejection of Claim 5 under 35 U.S.C. § 103(a) be withdrawn.

In response to the rejection of Claim 3 under 35 U.S.C. § 103(a), Applicant notes that Claim 3 is dependent on Claim 1 and is believed to be patentable for at least the reasons discussed above. Further, Applicant respectfully submits that Suzuki fails to cure any of the above noted deficiencies of Takayangi and Ahrenkeil.


Accordingly, Applicant respectfully requests that the rejection of Claim 3 under 35 U.S.C. § 103(a) be withdrawn.

Finally, Applicant requests that upon allowance of independent Claim 1, the withdrawn dependent claims which depend directly from Claim 1 should be rejoined and passed to allowance.

Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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